Listing of the Claims

1. (Original) : A process for improved performance in at least one fuel cell, having a loss in power output of at least 5% of an initial power output, wherein the fuel cell comprises a cathode, an anode, an anode chamber, a cathode chamber, a fuel comprising an anolyte that flows through the cell, and a catholyte gas, wherein the fuel cell is connected to an external load, and wherein the process comprises:

(a1) taking the load off the fuel cell; and

(a2) applying an external electric field from an external power source to the fuel cell to reverse electrochemical reactions until at least 5.0% of the lost power output is regained.

2. The process of claim 1 wherein the applying an electric field from an external power source to the fuel cell to reverse electrochemical reactions occurs by, either:

(a2a) cycling between a minimum voltage and a maximum voltage applied to the fuel cell until a maximum current is reached;

(a2b) cycling between a minimum current and a maximum current applied to the fuel cell until a minimum voltage is reached;

(a2c) applying an alternating voltage (AC voltage) until a maximum current is reached;

(a2d) applying an alternating current until a maximum voltage is reached across the fuel cell;

(a2e) applying a constant voltage until a maximum current is reached; or

(a2f) applying a constant current until a minimum voltage is reached.

3. (Original) : The process of claim 1 wherein the power source is selected from the group consisting of batteries, capacitors, solar cells, and another fuel cell.

4. (Original) :The process of claim 1 wherein the fuel cell is a direct feed fuel cell.

5. (Original) :The process of claim 4 wherein the fuel is in the liquid or vapor phase.

6. (Original) The process of claim 5 wherein the fuel is an alcohol or an ether.

7. (Original) :The process of claim 6 wherein the alcohol is methanol or ethanol.

8. (Original) :The process of claim 6 wherein the ether is diethyl ether.

9. (Original) :The process of claim 1 wherein at least 25% of the lost power output is recovered.

10. (Original) :The process of claim 9 wherein at least 50% of the lost power output is recovered.

11. (Currently Amended) :The process of claim 2 wherein the voltage was cycled between about ~~0V~~ 0 V and about 2.3 V.

12. (Original) :The process of claim 2 wherein the current was cycled between about 0 to about 2 A/cm^2.

13. (Currently Amended): The process of claim 2 wherein the AC voltage amplitude is about 0 to about ~~3V~~ 3 V per cell, and the frequency is about 16 to about 500 Hz.

14. (Original): The process of claim 2 wherein the AC current amplitude is about 0 to about 2 A/cm^2 root mean squares (rms), and the frequency is about 16 to about 500 Hz.

15. (Original): The process of claim 1 wherein before step (a2), the process further comprises:

(b) clearing the fuel cell of any liquid present therein to achieve a resistance of at least about 10% higher than the value before clearing the cell of any liquid; and

(c) starting the flow of anolyte through the fuel cell.

16. (Original): The process of claim 15 wherein the clearing of the fuel cell of any liquid present therein is achieved by:

(b1) stopping the flow of anolyte through the fuel cell; and

(b2) providing a continuous flow of catholyte gas through the fuel cell for at least 30 seconds;

17. (Original): The process of claim 15 further comprising:

(d) oxidizing the residual fuel in the fuel cell.

18. (Original): The process of claim 17 wherein oxidizing the residual fuel in the fuel cell is achieved by breaking the electrical connection between the cathode and anode.

19. (Original): The process of claim 17 wherein oxidizing the residual fuel in the fuel cell is achieved by applying a constant voltage in the range of about 0.005 V to about 0.8 V per cell.

20. (Original): The process of claim 15 wherein before step (c), the anode chamber is purged with air.

21. (Original): The process of claim 15 wherein before step (c), the anode chamber is purged with nitrogen.

22. (Original): The process of claim 15 wherein after step (a1) the anode chamber of the fuel cell is purged with water.

23. (Original): The process of claim 17 wherein before step (c) the anode chamber of the fuel cell is purged with air.

24. (Original): The process of claim 15 wherein the before step (c), the cathode chamber is purged with air.

25. (Original): The process of claim 20 wherein the cathode chamber is purged with air.

26. (Original): The process of claim 24 or 25 wherein the cathode chamber is purged with air for at least 10 seconds.

27. (Original): The process of claim 24 wherein the anode chamber is purged with air after the cathode chamber is purged.

28. (Original): The process of claim 24 wherein the anode chamber is purged with nitrogen after the cathode chamber is purged.

29. (Original): The process of claim 27 wherein the air comprises exhaust air from the cathode chamber.

30. (Original): The processes of claim 27, 28, or 29 wherein the anode chamber is purged for about 2-15 minutes.

31. (Original): The processes of claim 30, wherein the anode chamber is purged for about 5-15 minutes.

32. (Original): The processes of claim 31, wherein the anode chamber is purged for about 10-15 minutes.

33. (Original): The process of claim 15 wherein the resistance reached is at least about 20% higher than the value before clearing the cell of any liquid.

34. (Original): The process of claim 33 wherein the resistance reached is about 100 to about 500% higher than the value before clearing the cell of any liquid.

35. (Original): The process of claim 1 wherein fuel cells are in a stack.

36. (Original): The process of claim 15 wherein fuel cells are in a stack.

37. (Original): The process of claim 17 wherein fuel cells are in a stack.